Preface

The ability to perform separations for the analysis, concentration or isolation of substances present in mixtures (of varying degrees of complexity) is arguably fundamental to the maintenance of our technological civilization. Separations can also be rather difficult to define, and over the course of a number of debates where we tried to 'separate the wheat from the chaff', we defined separations for the purposes of this work as '*processes of any scale by which the components of a mixture are separated from each other without substantial chemical modification*'. Of course some of the processes that are used in separations have a very long history, and the terms used to describe them are in widespread general use. So, we talk about how it is possible to distil wisdom, precipitate an argument, extract meaning and crystallize an idea and who can predict the future uses of the word chromatography? Whilst separations have been practised as an *art* for millennia, the last hundred years or so has seen the elucidation of the fundamentals that lie behind many of these processes. Thus, although separations are most widely used for achieving some practical objective, a firm theoretical understanding has been put into place that does allow the use of the term *separation science*. We have tried here to reflect the theoretical and practical aspects of the topics in this encyclopedia, and have attempted to achieve a blend of theory, practice and applications that will enable someone knowledgeable in a field to go directly to a relevant article; whilst the novice can begin with an overview and gradually iterate towards the practical application.

One thing is clear, separations cover such a wide range of topics that no single individual can be knowledgeable, let alone expert, in them all. It is against this background that we decided that an encyclopedia designed to cover this science would be of value as a single source of reference that would provide access to the whole field of separations.

For the purposes of defining the scope and coverage of the encyclopedia we have divided the area of separations into 12 families, or topic areas, using separation principles based on affinity, centrifugation, chromatography, crystallization, distillation, electrophoresis, extraction, flotation, ion exchange, mass spectrometry, membranes and particle size. Whilst there is no doubt that different editors might have grouped these slightly differently, they did not seem to us to be capable of further reduction. Taken together, we believe that they provide coverage of the whole field.

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In preparing this multi-author and multi-volume work, all of the editors have been conscious of the gaps in their own expertise and the debt which they and the publishers owe to the Editorial Advisory Board, who to a large degree have compensated for the deficiencies in our own knowledge. Their help has been invaluable, as without them we would not have been able to achieve the necessary balance and it was, therefore, a source of particular sadness that one of them, Ted Woodburn, died prior to publication. Without Ted it is quite clear that the topic area of flotation would not have been so well covered, and we would like to think that he would have been well pleased with the finished work. We also hope that the masterly overview which he contributed to the encyclopedia, will be a lasting memorial to him. We are grateful to Jan Cilliers for stepping into the role of Editorial Board Advisor on flotation at short notice. We would also like to acknowledge the valuable input of G. J. Arkenbout at the beginning of this project, who was able to work with us for a short period of time before his death.

Assembling this knowledgeable and enthusiastic group of experts was a difficult task, and the editors would also wish to acknowledge the role of the Major Reference Works development team at Academic Press in this whole area, as well as thanking them for their assistance and patience throughout the project, from the initial planning to its final publication.

Finally, of course, we must acknowledge the contributions of the authors whose expertise constitutes this encyclopedia. Some of them have become firm friends in the period between the inception of this project and its completion. After all, separation science separates things but brings people together.

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Editors